CLAIMS

What is claimed is:

1. A method, comprising the steps of:

driving a polyphase motor with a drive voltage; and

sampling a back emf of a selected phase of the motor to determine positional error of a motor rotor only while a drive voltage of the selected phase is substantially zero.

2. The method of claim 1 wherein the drive voltage is substantially sinusoidal.

3. The method of claim 1 wherein the drive voltage is substantially trapezoidal.

4. The method of claim 1 wherein the polyphase motor is a component of an implantable medical device.

5. The method of claim 4 wherein the medical device is a heart assist pump.

6. The method of claim 1 wherein the motor is a brushless DC motor.

7. The method of claim 6 wherein the motor is a three phase brushless DC motor.

8. The method of claim 1 wherein the drive voltage of the selected phase passes through zero during sampling.

9. The method of claim 1 wherein the selected drive voltage does not pass through zero during sampling.

10. The method of claim 1 further comprising the step of:

controlling commutation of the motor in accordance with the sampled back emf.

11. The method of claim 1 further comprising the step of:

varying a frequency of the drive voltage in accordance with the sampled back emf.

12. The method of claim 1 further comprising the step of:

generating a speed control signal corresponding to a difference between a desired rotor angular velocity and a rotor speed inferred from a frequency of the drive voltage; and

varying an amplitude of the drive voltage in accordance with the speed control signal.

13. An apparatus, comprising:

a brushless DC motor;

a commutation control providing a commutation control signal for a selected phase of the motor in accordance with a sampled back electromotive force (emf) of that phase, wherein the back emf of the phase is sampled only while the corresponding drive voltage for the selected phase is substantially zero, wherein a frequency of a drive voltage of the brushless DC motor is varied in accordance with the commutation control signal.

14. The apparatus of claim 13 wherein the drive voltage is substantially sinusoidal.

15. The apparatus of claim 13 wherein the drive voltage is substantially trapezoidal.

16. The apparatus of claim 13 wherein the sampled back emf is normalized with respect to a commanded angular velocity of a motor rotor.

17. The apparatus of claim 13 further comprising:

a speed control providing a speed control signal in accordance with difference between a rotor angular velocity inferred from a frequency of the drive voltage and a commanded angular velocity, wherein an amplitude of the drive voltage is varied in accordance with the speed control signal.

18. The apparatus of claim 13 further comprising:

a speed control providing a speed control signal in accordance with difference between a rotor angular velocity inferred from a frequency of the back emf and a commanded angular velocity, wherein an amplitude of the drive voltage is varied in accordance with the speed control signal.

19. The apparatus of claim 13 further comprising:

an inverter;

a waveform generator providing a drive waveform to the inverter, wherein a frequency of the drive waveform varies in accordance with the commutation control signal, wherein the inverter provides the drive voltage at a same frequency as the drive waveform.

20. A method, comprising the steps of:

driving a polyphase motor with a drive voltage having substantially the same waveform as a back electromotive force (emf) generated by the motor; and

sampling the back emf of a selected phase of the motor to determine positional error of a motor rotor only while a corresponding drive voltage of the selected phase is substantially zero.

21. The method of claim 20 wherein the drive voltage and the back emf have a substantially sinusoidal waveform.

22. The method of claim 20 wherein the drive voltage and the back emf have a substantially trapezoidal waveform.

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